

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## SCHEME OF TEACHING & EXAMINATION

### B.E. III SEMESTER CIVIL ENGINEERING

S.No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Exam Theory/Practical			Total Marks	Credit L+(T+P)/ 2
				L	T	P	ESE	CT	TA		
1	Appl. Mathematics	300311 ( 14 )	Mathematics III	4	1		80	20	20	120	5
2	Civil Engg.	320312 ( 20 )	Fluid Mechanics -I	4	1		80	20	20	120	5
3	Civil Engg.	320313 ( 20 )	Surveying -I	3	1		80	20	20	120	4
4	Civil Engg.	320314 ( 20 )	Mechanics of Solids	3	1		80	20	20	120	4
5	Civil Engg.	320315 ( 20 )	Building Materials	3	1		80	20	20	120	4
6	Electronics & Telecom Engg.	320316 ( 28 )	Electronics & Instrumentation	3	1		80	20	20	120	4
7	Civil Engg.	320321 ( 20 )	Fluid Mechanics - I Lab			3	40		20	60	2
8	Civil Engg.	320322 ( 20 )	Surveying Field Work- I			3	40		20	60	2
9	Civil Engg.	320323 ( 20 )	Materials Testing Lab			3	40		20	60	2
10	Civil Engg.	320324 ( 20 )	Computer Lab			3	40		20	60	2
11	Humanities etc.	300325 (46 )	Value Education			1			40	40	1
12			Library			1					
			<b>Total</b>	<b>20</b>	<b>6</b>	<b>14</b>	<b>640</b>	<b>120</b>	<b>240</b>	<b>1000</b>	<b>35</b>

L- Lecture            T- Tutorial  
 P- Practical        ESE- End Semester Exam  
 CT-Class Test      TA- Teacher's Assessment

Note : Duration of all theory papers will be of **Three Hours**.

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL  
UNIVERSITY, BHILAI (C.G.)**

Semester : **B.E. III Sem.**

Branch: **Civil, Mechanical, Mining,  
Chemical**

Subject : **MATHEMATICS-III**

Code : 300311(14)

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total Marks in End Semester Exam. : **80**

Minimum number of class test to be conducted: **02**

**UNIT - 1 FOURIER SERIES**

**(No. of periods 8+2)**

Euler's Formula, Functions having points of discontinuity, Change of interval, Even & Odd functions, Half range series, Harmonic analysis.

**UNIT - 2 LAPLACE TRANSFORM**

**(No. of periods 8+2)**

Definition, Transform of elementary functions, Properties of Laplace transform, Transform of derivatives & integrals, Multiplication by  $t^n$ , Division by  $t$ , Evaluation of integrals, Inverse Laplace Transform, Convolution theorem, Unit step function, Unit impulse function, Periodic function, Application to solution of ordinary differential equations.

**UNIT - 3 PARTIAL DIFFERENTIAL EQUATION**

**(No. of periods 8+2)**

Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables.

**UNIT - 4 COMPLEX VARIABLES**

**(No. of periods 8+2)**

Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, Residue, Evaluation of real definite integrals.

**UNIT - 5 STATISTICS**

**(No. of periods 8+2)**

Random variables, Discrete & continuous probability distributions, Expectation, Mean & Standard Deviation, Moments & moment generating function, Distributions- Binomial, Poisson and Normal distributions.

**TEXT BOOKS: -**

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

**REFERENCE BOOKS: -**

1. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N. Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Subject: **Fluid Mechanics – I**

Total Theory Periods: **40**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **2**

Branch: **Civil Engineering**

Code: **320312 (20)**

Total Tutorial Periods: **10**

## **Unit 1**

### **Introduction**

Fluid and continuum, physical properties of fluids ideal and real fluid, Newtonian and Non-Newtonian Fluid

### **Fluid Statics**

Pressure density height relationship, pressure measurement by Manometers, Pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, metacentric height, fluid mass subjected to uniform accelerations.

## **Unit 2**

### **Kinematics of fluid flow**

Steady and unsteady flow, uniform and non uniform flow, laminar and turbulent flow, one, two and three dimensional flow, streamlines, streak lines and path lines, circulation and vorticity, rotational and irrotational flow, velocity potential and stream function, graphical and experimental methods of drawing flow nets, continuity equation.

## **Unit 3**

### **Dynamics of fluid flow**

Euler's equation of motion along a streamline and its integration, Bernoulli's equation and its applications – Pitot tube, Venturimeter, orificemeter, nozzles, momentum equation and its application to stationary and moving plates/vanes, pipe bends, problems related to combined application of energy and momentum equations.

## **Unit 4**

### **Flow in Pipes**

Reynold's experiment, experimental determination of critical velocity, transition from laminar to turbulent flow, Laminar flow through circular tubes, flow between parallel plates, minor losses in pipe lines, loss due to sudden contraction, expansion, etc; Hot wire anemometer and LDA.

### **Flow in open Channel**

Comparison between open channel and pipe flow, definition of uniform and non-uniform flow, uniform flow formulae, Chezy's and Manning's Formula, Hydraulically efficient channel section of rectangular, trapezoidal and circular type.

## **Unit 5**

### **Flow through mouthpieces and orifices**

Hydraulic coefficients of orifice, bell method orifice, mouthpieces, Borda's mouthpieces, running free and submerged.

### **Notches and Weirs**

Rectangular, triangular and trapezoidal notches and weir, cippoletti and broad crested weir, aeration of nappe, cavitations submerged weir.

**Name of Text Books:**

Fluid Mechanics and Machines – Dr. A.K. Jain (Khanna Publications)

Fluid Mechanics and Machines – Dr. R.K. Bansal (Laxmi Publications)

**Name of Reference Books:**

Fluid Mechanics – Dr. P.N. Modi (Standard Book House)

Mechanics of Fluid – Irving H. Shames (McGraw Hill)

Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)

Fluid Mechanics – R.J. Garde (New Age International Publication)

Fluid Mechanics – Streeter V.L. & Wylie E.B. (Tata McGraw Hills)

Fluid Mechanics – John F Douglas (Pearson Publication)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Branch: **Civil Engineering**

Subject: **Surveying-I**

Code: **320313 (20)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **2**

## **Unit 1 Leveling**

Different methods of determining elevations: Spirit, Trigometric, Barometric and Photogrammetric methods, Spirit leveling-Definitions of terms, Principle, Construction, Temporary and permanent adjustment of levels. Sensitivity of bubble tube, Automatic levels, Levelling staves, Methods of spirit leveling Booking and reduction of field notes, Curvature and refraction, Reciprocal leveling Plotting of profiles, Barometric leveling, Construction and field use of altimeter, Trigonometric leveling-simple and reciprocal observations, Source of errors and precision of leveling procedures.

## **Unit 2 Contouring**

Direct and Indirect methods of contouring. Interpolation of contours, Drawing section from contour map, Application and Modern methods of depicting relief on a Map.

## **Unit 3 Theodolite and Traversing**

Venire and microptic theodolites, Temporary and permanent adjustments, Requirements of non-adjustable parts, Measure of horizontal and vertical angles by different methods Principle of traversing by theodolite, Field work and checks, Computation of coordinates, Source of errors, Precision of traversing, Checking and adjusting of traverses, Omitted measurements

## **Unit 4 Plane Table Surveys**

Principles, Advantages and disadvantages, Plane table equipment, Use of Telescopic Alidade and Indian Pattern tangent Clinometer, Different methods of Plane Table Surveying, Resection-Two and Three point problems. Fields work in Plane Table Surveying and contouring.

## **Minor Instruments**

Hand level, Abney Level, clinometers, ceylon ghat tracer, Box Sextant, Pentagraph, planimeter, ediograph.

## **Unit 5 Curves**

Classification of curves; Elements of Circular, Transition and Vertical curves, Theory and method of setting out Simple, Transition and Vertical curves. Special field problems.

## **Name of Text Books:**

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)

Surveying (Vol. I & II) – Kanetkar (Pune Vidyarthi Griha Prakashan, Pune)

## **Name of Reference Books:**

Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)

Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi, 1993)

Fundamentals of Surveying – S.K. Roy (Prentice Hall of India)

Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Subject: **Mechanics of Solids**

Total Theory Periods: **40**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **2**

Branch: **Civil Engineering**

Code: **320314 (20)**

Total Tutorial Periods: **10**

## **Unit 1**

### **Stress Strain Relations**

Types of stresses and strains, Mechanicals properties and testing of steel, Hooke's law, Uniaxial tensile test, stress – strain curve, hardness, impact, Poisson's ratio, Modulus of rigidity, Bulk modulus, Relation between the elastic constants, Thermal effects, Elongation of bars of constant and varying sections. Statically indeterminate problems in tension and compression. Thin cylindrical and spherical vessels.

## **Unit 2**

### **Analysis of Stresses and Strains**

Body forces, Surface forces, Internal Force, Stress at a point. Components of stress in rectangular coordinates, Principal stresses, Transformation equations, Stress invariants. Plane stresses. Mohr's circle for plane stress, Differential equations of equilibrium.

Deformable bodies, Concepts of normal strain and shear strain, Strain components at a point. Transformation equations. Principal strains. Mohr's circle for strains. Compatibility conditions. Displacement equation of equilibrium, Plane strain.

## **Unit 3**

### **Bending of Beams**

Theory of simple bending - limitations - bending stresses in beams of different cross sections, beams of uniform strength, beams of two materials, shear stresses in symmetrical elastic beams transmitting both shear and bending moment.

Shear force and bending moment diagrams for simply supported overhanging and cantilever beams and statically determinate plane frames

## **Unit 4**

### **Columns and Combined stresses**

Stable and unstable equilibrium, Short columns, Euler's formula for long columns, Rankin's formula.

Beams subjected to bending and shear, Eccentrically loaded short column, Kern of rectangular sections, Middle third rule, stability of gravity dams & retaining walls.

## **Unit 5**

### **Unsymmetrical Bending and Torsion**

Unsymmetrical bending – Location of neutral axis, Shear flow - shear centre - determination of shear centre for simple sections.

Torsion of circular solid and hollow circular shafts - power transmission. Closed coiled and open coiled helical springs.

### **Name of Text Books:**

Strength of Materials – R.K. Rajput (S. Chand & Co.)

Mechanics of Materials – B.C. Punmia (Laxmi Publication)

**Name of Reference Books:**

Mechanics of Structures (Vol. – I) – Junarkar (Charotar Publications)

Strength of Materials – Timoshenko, S. & Gere (CBS Publishers)

Introductions to Solid Mechanics –Shames & Pitarresi (Prentice Hall of India)

Engineering Mechanics of Solid – Popov (Pearson Publication)

Strength of Materials – S. Ramamurtham (Dhanpat Rai Publications)

Strength of Materials (Part-I) – Timoshenko (CBS Publishers)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Branch: **Civil Engineering**

Subject: **Building Materials**

Code: **320315 (20)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **2**

## **Unit 1 Cement**

Types of Cement, Hydration of cement, tests on properties of cement, ferro cement.  
Classification of Aggregates (Coarse and Fine) and their properties, tests on aggregates.  
Classification of Pozzolanas and applications.

## **Unit 2 Concrete**

Properties of concrete in fresh and hardened state, water cement ratio, Modulus of elasticity, factors affecting strength of concrete and durability, mixing, transporting, placing, compacting and curing concrete, variables in proportioning concrete mixes, admixtures in concrete, tests on concrete.

## **Unit 3 Special Concrete**

Special concrete – Polymer concrete, fibre reinforced concrete, light weight concrete, high strength concrete, heavy weight concrete, green concrete, ready mixed concrete, shotcrete, smart concrete.  
Fly ash bricks, hollow cement concrete blocks.

## **Unit 4 Timber and Plywood**

Characteristics of good timber, seasoning and preservation, names of timber producing trees and their relative market value.  
Types and uses of plywood, veneers and hardboards.  
Low cost materials for construction – System concepts, cost effective materials, industrial wastes, agricultural wastes, methods needed for propagation of new technologies from laboratory to field.

## **Unit 5 Paints, Glass etc.**

Commercially available varieties of ceramics, glass and their uses, types of tiles, method of manufacturing and tests for suitability.  
Uses of Plastics and PVC.  
Composition and use of paints, varnishes and distempers.  
Composite materials, types and uses.

## **Name of Text Books:**

Building Materials – S.K. Duggal (New Age Publication)  
Building Materials – S. C. Rangwala (Charotar Publication)

## **Name of Reference Books:**

Concrete Technology – A.M. Neville & J.J. Brooks (Pearson Education)  
Concrete Technology – M.S. Shetty (S. Chand & Co.)  
Engineering Materials – Surendra Singh (Laxmi Publication)  
Construction Engineering and Management – S. Seetharaman (UmeshPublication)  
Building Materials – Gurucharan Singh (Standard Publishers, Delhi)



# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem. 3<sup>rd</sup>**

Branch: **Civil Engineering**

Subject: **Fluid Mechanics - I Lab**

Practical Code: **320321 (20)**

Total Practical Periods: **36**

Total Marks in End Semester Exam: **40**

## **Experiments to be performed (minimum 10 experiments)**

- To determine the metacentric height of a ship model.
- To Plot the flow net for a given model using the concept of electrical analogy.
- Verification of Bernoulli's equation.
- Verification of momentum equation.
- To calibrate a venturimeter and study the variation of the coefficient of discharge with the Reynolds number.
- To calibrate a orificemeter and study the variation of the coefficient of discharge with the Reynolds number.
- Experimental determination of critical velocity in pipe.
- Determination of head loss coefficient due to sudden expansion in pipe.
- Determination of head loss coefficient due to sudden contraction in pipe.
- Determination of head loss coefficient in pipe bends.
- To determine the hydraulic coefficients ( $C_c$ ,  $C_d$  and  $C_v$ ) of an orifice.
- To determine the coefficient of discharge of a mouth piece.
- To calibrate a triangular notch.
- To calibrate a rectangular notch.
- To obtain the surface profile and the total distribution of a forced vortex.

## **List of Equipments / Machine Required:**

- Ship Model
- Electrical Analogy Apparatus
- Bernoulli's Apparatus
- Apparatus for momentum theorem
- Venturimeter
- Orificemeter
- Pipe Flow Apparatus
- Orifice Apparatus
- Mouth Piece Apparatus
- Notch Apparatus
- Vortex Flow Apparatus

## **Recommended Books:**

- Hydraulics Laboratory Manual – S.K. Likhi (New Age International Ltd.)
- Fluid Mechanics – Jagdish Lal (Metropolitan Educational, New Delh-2)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Branch: **Civil Engineering**

Subject: **Surveying Field Work - I**

Practical Code: **320322 (20)**

Total Practical Periods: **36**

Total Marks in End Semester Exam: **40**

## **Experiments to be performed (minimum 10 experiments)**

1. Determination of location of a point with the help of Two point problem.
2. Determination of location of a point with the help of Three point problem.
3. Setting out of curve by ordinates or offsets from long chord.
4. Setting out of curve by successive bisection of arcs.
5. Setting out of curve by offsets from chords produced (Or by deflection distances).
6. Setting out of curve by two theodolite method.
7. To find out the position of points by the Intersection method.
8. To determine the height of object when base is accessible.
9. To determine the height of tower when base is inaccessible and instrument stations are in same vertical plane.
10. To determine height of tower when base is inaccessible and instrument stations are in different plane.
11. To determine sensitivity of bubble tube.
12. Measurement of horizontal angle by repetition method.
13. Measurement of horizontal angle by reiteration method.
14. Contouring and its plotting.
15. To determine the elevation of a point with respect to reference elevation by Fly Leveling.
16. Study of miner instruments.

## **List of Equipments / Machine Required:**

Metric Chain (30 m)  
Tape (15m, 30 m)  
Ranging Rod (2 m, 3m)  
Plumb bob  
Arrows  
Dumpy Level  
Theodolite  
Leveling Staff (Folding and Non-folding)  
Wooden Pegs  
Plain Table Accessories (Drawing Board – 70 x 60 x 1.5 cm, Spirit Level, Trough Compass,  
Tripod Stand, Alidade, Plumb bob for centering)  
Offset Rod  
Optical Square  
Cross Staff

## **Recommended Books:**

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)  
Surveying (Vol. I & II) – Kanetkar T.P. (Pune Vidyarthi Griha Prakashan, Pune)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Branch: **Civil Engineering**

Subject: **Material Testing Lab**

Practical Code: **320323 (20)**

Total Practical Periods: **36**

Total Marks in End Semester Exam: **40**

## **Experiments to be performed (minimum 10 experiments)**

1. Determination of Compressive strength of cement.
2. Determination of Tensile strength of cement.
3. Determination of Fineness of cement by sieving method.
4. Determination of Fineness of cement by Blain Apparatus.
5. Determination of Soundness of cement.
6. Determination of Specific gravity of cement.
7. To determine Uniaxial Tensile Test of mild steel.
8. To determine Izod Charpy Value of given mild steel.
9. To determine the Rockwell Hardness of given Material.
10. To determine Compressive Strength of Wood: (a) Along the fibre and (b) Across the fibre.
11. Determination of Specific gravity and water absorption of aggregate.
12. Abrasion Test on tiles.
13. Impact test on tiles.
14. Flexural Strength of Tiles.
15. To study the Cupping Test Machine and determine Erichser value of mild steel sheet.

## **List of Equipments / Machine Required:**

1. Cube mould 7.06 cm size
2. IS Sieve 80, 40, 20, 10, 4.75, 2.36, 1.18 mm and 600, 300, 150, 90 Micron
3. Sieve Shakers
4. Tensile Strength Testing Machine
5. Oven Wire Basket
6. Spring Balance and Weighing Balance
7. Air permeability blain apparatus
8. Abrasion Testing Machine
9. Flexural Strength Testing Machine for tiles
10. Universal Testing Machine
11. Hardness Testing Machine
12. Impact Testing Machine

## **Recommended Books:**

- Lab Manual Concrete Lab – M.L. Gambhir (Tata McGraw Hill)  
Concrete Technology – M.S. Shetty (S. Chand & Co.)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **B.E. III Sem.**

Branch: **Civil Engineering**

Subject: **Computer Lab**

Practical Code: **320324 (20)**

Total Practical Periods: **36**

Total Marks in End Semester Exam: **40**

## **Experiments to be performed**(Minimum 10 experiments)

1. A C++ program to locate the CG of a given section.
2. A C++ program to determine the moment of inertia of a given section.
3. A C++ program to determine of radius of gyration of a given section.
4. A C++ program to determine the effective length of a column.
5. A C++ program to determine of the slenderness ratio of a column.
6. A C++ program to determine of crippling load for a column.
7. A C++ program to determine the support reactions for a simply supported beam subjected to UDL.
8. A C++ program to determine of the maximum BM for a simply supported beam subjected to UDL.
9. A C++ program to determine of the SF at a section for a simply supported beam subjected to UDL.
10. A C++ program to determine of the BM at a section for a simply supported beam subjected to UDL.
11. Drawing application of MS Word.
12. Typing of mathematical statements in MS Word.
13. Graphical representation of data in MS Word and MS Excel.
14. Spread sheet application of MS Excel.
15. Application of MS Powerpoint.

## **List of Equipments / Machine Required:**

- (i) PC system.
- (ii) Turbo C++ compiler.

## **Recommended Books:**

- (1) Let us C++ – Yeshwant Kanitkar (BPB Publications)
- (2) Problem Solving with C++ – Savitch (Addison Wesley Publication)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Semester : **B.E. III Sem.**

Subject : **Value Education**

No. of Periods : 2 pds/week

Total Marks in End Semester Exam. : NIL

Minimum number of class test to be conducted : Two

Branch : Common to all Branches

Code : 300325(46)

Tutorial Periods : NIL

Teacher's Assessment : 40 Mks

## UNIT – I

- **STUDY OF BASIC HUMAN OBJECTIVES** : Everlasting solution  $\frac{1}{4}lek/kku\frac{1}{2}$  prosperity  $\frac{1}{4}e`f)\frac{1}{2}$  trust in self and others  $\frac{1}{4}vHk;\frac{1}{2}$  and coexistence  $\frac{1}{4}lgvfLrRo\frac{1}{2}$  for balance in nature. Need and importance of aforesaid basic human objectives and how to achieve these.

## UNIT – II

- **CONCEPT AND UNDERSTANDING OF HUMAN HAPPINESS**  
Meaning and concept of "happiness", incessant happiness, its relationship with guarantee of physical needs, comforts, physical and sensory pleasures with its transient nature, misery; The only method to minimize incessant happiness : gaining right understanding about oneself, one's body, one's relationship with other human beings, Nature and total existence.

## UNIT – II

- **PROPER UNDERSTANDING** about the order in Nature  $\frac{1}{4}O;oLFkk\frac{1}{2}$  and co-existence  $\frac{1}{4}lgvfLrRo\frac{1}{2}$  at various levels, such as, I and my body, family, society, Nature and existence.
- **UNDERSTANDING THE SELF** : Understanding human reality – I and my body, present understanding of the self, physical needs, relation with others and with Nature, gaining proper understanding of the self, discrimination between 'I' and my 'body', characteristics and the needs of 'I', of my 'body' and 'body' & 'I'.

## UNIT – IV

- **SYNERGATIC ORDER  $\frac{1}{4}O;oLFkk\frac{1}{2}$  and COEXISTENCE  $\frac{1}{4}lgvfLrRo\frac{1}{2}$  among HUMANS, IN NATURE & IN EXISTENCE :**
  - Conceptual understanding of natural relations and consequent values, of family and relation therein, of society and role of engineers therein, overall excellence' : concept, its universal parameters and total human behaviour
  - Inanimate  $\frac{1}{4}tM+\frac{1}{2}$  and consciousness  $\frac{1}{4}pSrU;\frac{1}{2}$  aspects of Nature, Four distinct synergetic orders in Nature - Padaarth Awastha  $\frac{1}{4}inkFkZ\ voLFkk\frac{1}{2}$  Pran Awastha  $\frac{1}{4}izk.k\ voLFkk\frac{1}{2}$  Jiv Awastha  $\frac{1}{4}tho\ voLFkk\frac{1}{2}$  and Gyan Awastha  $\frac{1}{4}Kku\ voLFkk\frac{1}{2}$  complementary supplementary evolutionary connection amongst above orders, identifying and implementing "Appropriate Technology".
  - Synergetic order among interacting entities of Nature operating in all pervading changeless Shunya or Satta, Indivisible interconnectedness of Satta and Prakriti and its implications.

## UNIT – V

- **IMPLICATIONS OF PROPER UNDERSTANDING**
  - Awakening  $\frac{1}{4}tkx`fr\frac{1}{2}$  the common goal of all human beings,
  - promotion and perseverance of synergetic order and co-existence at all levels leading to incessant happiness.
  - Natural manifestation of universal human values and thereby incessant happiness
  - Undivided Society  $\frac{1}{4}vfoHkkT;\ lek\frac{1}{2}$  and Universal Organised System  $\frac{1}{4}lkoZHkkSe\ O;oLFkk\frac{1}{2}$
  - Transition from synergetic disorder  $\frac{1}{4}vO;oLFkk\frac{1}{2}$  to synergetic order  $\frac{1}{4}O;oLFkk\frac{1}{2}$
  - Evaluation of Understanding, work and behaviour.

## REFERENCES

1. Jeevan Vidya Camp  $\frac{1}{4}f'kfoj\frac{1}{2}$  notes
2. An Introduction to Jeevan Vidya by Shri A. Nagaraj

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